EXHIBIT 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kanade et al.	)	**Examiner:** Anyikire, C.
Serial No.:	10/032,648	)	**Art Unit:** 2621
Filing Date:	October 23, 2001	)	**Atty. Docket No.** 010329

Title: SYSTEM AND METHOD FOR OBTAINING VIDEO OF MULTIPLE MOVING FIXATION POINTS WITHIN A DYNAMIC SCENE

DECLARATION OF TAKEO KANADE

I, Takeo Kanade, declare as follows:

1. I am over the age of eighteen and am competent to make this declaration.

2. I am one of the named inventors for the above-referenced patent application ("the Subject Application").

3. I am the U. A. and Helen Whitaker University Professor of Computer Science and Robotics at Carnegie Mellon University ("CMU"), Pittsburgh, PA. I am also the Director of Quality of Life Technology Engineering Research Center at CMU.

4. I, along with my co-inventors, conceived of the invention described in the Subject Application prior to September 17, 2001.

5. I worked with Mark Knedeisen, a registered patent attorney from Kirkpatrick & Lockhart LLP (now K&L Gates LLP) in Pittsburgh, PA, in his capacity as outside patent counsel for CMU, to prepare the Subject Application.

6. My co-inventors, Mr. Knedeisen, and I worked diligently to prepare and file the Subject Application from a date prior to September 17, 2001 to October 23, 2001, the filing date of the Subject Application, as outlined below.

a. I met with Mr. Knedeisen prior to September 17, 2001 to discuss the invention described in the Subject Application.

b. Attached hereto as Exhibit A is the first page of a document that I provided to Mr. Knedeisen at or prior to the meeting described in the preceding paragraph that explains the invention.

c. Following our meeting, I received at least two (2) drafts of the Subject Application from Mr. Knedeisen prior to September 17, 2001. One of those drafts was sent to me September 6, 2001. Attached hereto as Exhibit B is a partially redacted cover letter from Mr. Knedeisen to me dated September 6, 2001, which enclosed a draft of the application.

d. Attached hereto as Exhibit C is a partially redacted email chain that includes an email from me to Mr. Knedeisen and my co-inventors dated September 28, 2001, stating that I was going to be out of town for 10 days, and asking my co-inventors and Mr. Knedeisen to meet in order for my co-inventors to provide their comments on the application to Mr. Knedeisen.

e. The draft to be discussed in the meeting referred to in the above paragraph was sent to me on September 6, 2001. The events of September 11, 2001 delayed my opportunity to review the application.

f. Attached hereto as Exhibit D is a partially redacted email from one of my co-inventors, Robert Collins, to Mr. Knedeisen and me, dated October 5, 2001, with comments on the draft application.

g. Attached hereto as Exhibit E is a partially redacted email from Mr. Knedeisen to my co-inventors and me dated October 11, 2001, with a revised draft of the application.

h. Attached hereto as Exhibit F is a partially redacted email from Mr. Collins to Mr. Knedeisen and me, also dated October 11, 2001, with comments on the draft application referred to in the previous paragraph.

i. After my co-inventors and I reviewed the final draft, the application was filed on October 23, 2001.

7. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any registration resulting therefrom.

Date: 9/21/2010

TKanade

Takeo Kanade

EXHIBIT A

A Method for Obtaining Video of Multiple Moving Fixation Points within a Dynamic Scene by Virtual Servoing

Takeo Kanade, XX, YY

Motivation:

For applications such as sports, entertainment and surveillance, it is often desirable to take a set of images of a spot of action, called fixation point, from all the surrounding angles by a large number of cameras. From such a set of images one can create, for example, Matrix-like fly-around replays, as shown as demonstrated by EyeVision, or measurements of various characteristics of motion and other attributes of players. Such a display heightens the viewer's ability to perceive the 3D spatial relationships between players, the ball, and field markers.

Because the playing filed is large and the target (spot of action – player or ball) is moving, previous systems capture such a set of images by using a robotics camera head, consisting of a camera and a pan/tilt device which is servoed to swing the camera on it to follow the target on the field. Such a method, however, can take a video set of only one fixation point. This patent appliocation document describes a multi-camera system for achieving this goal for any number of fixation points by virtaully servoing.

This allows the system, unlike the previously applied patent, to work without needing pan/tilt hardware for each camera, and to create video on **multiple moving fixation points**.
Also, this eliminates, unlike the previously applied patent, the concept of designating a specific camera as a master camera and the rest as slave cameras, and instead allowing multiple cameras to be masters and slaves **simultaneously**.

For the rest of this document, we consider a sports field application as an illustration, but the method is applicable to other entertainment or observation systems.

Method:

Figure 1 shows the overall block diagram of the method.

Camera Heads

The method includes a number of **camera heads**. They are situated around a playing field. Each camera head has the capability to image the whole or most of the field in focus simultaneously. There are several ways to realize this.

a) Single camera with a panoramic wide field of view by means of parabolic, spherical or other types of mirror with which a wide angle of view is mapped to the imaging surface of the camera
b) Single camera with a panoramic wide field of view by means of fish-eye or other types of lenses with which a wide angle of view is captured onto the imaging surface of the camera

c) A certain number of cameras, where all of them are static (ie. not necessarily on a pan/tilt device), which are aligned so that their imaging centers are ideally the same or as close as possible. Each camera is assigned a section on the field for imaging at its highest resolution of interest and at focus. These sections of the playing field to be imaged by the cameras are staggered so that in total they provide the coverage of the whole field with minimum overlap and without holes. Depending the size and shape of the field and the location of the camera heads, the number of required cameras and their most appropriate arrangement will be different.

All of the camera heads that are used needed not to be of the same. Different types of camera head can be mixed. With one of these configuration or their variation, we assume in the following description that each camera's output is video of the whole or most of the field at its maximum resolution.

Those cameras are all synchronized, so that frames from all cameras are taken simultaneously and its timing labeled electronically. All of the output videos of cameras on each camera head are continuously stored in the video storage.

Virtual Video Generator

The **Virtual Video Generator,** given a viewing angle and zoom parameter, computes an image frame which a virtual camera pointing to the given angle with the given zoom would have output. For replay the virtual video generator retrieves the video data stored in the video storage. For real-time operation, it uses the real-time video from cameras, at the same time as they are stored into the video storage.

The process of virtual video generation is slightly different for different types of camera head.

a) For a camera head with panoramic mirror, it simply consists of first cropping part of the image corresponding to the space angle of the field of view (FOV) of the virtual camera, and then transforming the cropped image to remove the distortion that is contained due to the parabolic or other types of mirrors. This process is a well known process.
b) For a camera head with fish-eye lens, it consists of first cropping part of the image corresponding to the space angle of the field of view (FOV) of the virtual camera, and then transforming the cropped image to remove the distortion that is contained due to the fish-eye or other types of lenses of the same effect. This process is also a well known process.
c) For a camera head that is made of multiple cameras, the process is a little more involved. First the field of view (FOV) of the virtual camera is to be backprojected onto the playing field to obtain the portion of the filed the virtual camera must be imaging (Figure 4-a). If it is completely contained in the field of view of one of the real cameras (Figure 4-b), then the virtual video can be obtained by a process of cropping the corresponding region from the real image, and transforming it perspectively onto the imaging plane of the virtual camera (Figure 4-c). If the portion of the field that the virtual camera images is not contained totally in that of any of single physical camera, but overlaps across FOV's of two or more real cameras. (Figure 4-d), the process consists of cropping the overlapped portion from each real image, transforming each of them by an appropriate perspective transformation which corresponds to the transformation from the imaging plane of each physical camera to that of the virtual camera,

and finally merging all of them into a single frame. This merging process is known as panoramic mosaicing and many algorithms have been published (REFERENCE on Mosaic).

Virtual master camera controller

The **virtual master camera controller** corresponds to the physical camera in the traditional videoing or to the physical master camera controller in the system of Patent Application 1. In this new method, any virtual camera defined as above can be designated as the virtual master camera. The virtual camera controller is connected to an operator interface made of a certain pointing device plus a video display. It can be a traditional physical cameraman's tripod, with angle sensors and zoom and height control knobs, on which a video display monitor is placed in place of an actual camera; such a configuration gives operability which is most accustomed natural to a human operator. Or, it can be simply a computer terminal where mouse or other input device is used as a replacement of the tripod, and the terminal monitor is used as the video output monitor. In either case, the virtual master camera controller reads the input device's sensors as the desired virtual pan/tilt angle and zoom, feed them to the virtual video generator of the camera specified as the virtual master camera.

It is within the spirit of this patent to replace the human cameraman with computer vision software that automatically detects and tracks moving objects by processing video from the master camera. The computer vision software can also automatically select a different master camera to decrease the distance to, or increase the visibility of, an object being tracked.

Unlike the traditional videoing or to the physical master camera controller in the system of Patent Application 1, multiple, in fact, an unlimited number of virtual master cameras can co-exists. **One of the novel use of this technology is to let each of the viewers to be the master cameraman.**

fly-around playback generator

The fly-around playback generator operates in the same manner as the corresponding function described in Patent1, but it works with the virtual master camera controller instead of a physical master camera, and virtual video generators instead of physical cameras. The fly-around playback generator receives the information of the master camera's virtual viewing direction, zoom, and height. Using the calibration data of the playing field (which is to be done prior to the system operation) it computes the three-dimensional location of the interesting action for which a fly-around playback is desired to be generated. Using the calibration data, it also computes the corresponding viewing angles and zoom data of other slave virtual cameras. Those data are sent to the individual virtual video generators which return virtual videos of the fixation point viewed from those other view points. The fly-around playback generator now outputs these images in sequence in the order of camera placements, clock- wise or counter clock wise.

Advantages over existing methods

The method described here has three most important and critical advantages over the previous master-slave pan/tilt-based system.

First, this method will never "miss" an action of interest. In the physical master-slave pan/tilt-based system, a human master camera operator is tasked to identify and track the action of interest while play is occurring, and all the cameras follow that action. Therefore, if (1) an action of true interest is occurring somewhere else (like fake play), (2) the operator's tracking is delayed, or (3) the pan/tilt devices have servoing errors or delay, then the system fails to capture video of the action totally or partially. In contrast, the method of this patent application captures all of the images all the time, while may be distorted or by pieces or in different resolutions than the final output, and uses computer processing to generate the images that correctly controlled virtual cameras would view.

Secondly, following the target is done by computer software virtually, rather than servo control of physical pan/tilt devices, this method will not suffer any control delay, offset, and other errors associated with servoing. Therefore matching the point of rotation among images will be much better than previous methods.

Thirdly, this method allows for having multiple and any number of fixation points simultaneously. The master camera and the rest of cameras are realized by virtual cameras in Virtual Video Generator; following one trajectory of fixation points can be done completely independently of another. As a result, unlimited number of fixation points be realized. In its extreme, the control could be given to the individual viewer. Also, this process of choosing the fixation point can be done both in real time as the play is progressing, or in video replay after the play occurred.

All this combined, there are three degrees of freedom in this system in playing the video replay: the video can be replayed along the time (forward or backward), the view point (that is, switching of video cameras to be replayed) can be chosen along the space (clockwise or counter clock wise), and the target (that is the focal point) can move on the field in any trajectory. The three freedoms can be used individually or any combinations in replaying the video. This can be explained by using Figure 5. The horizontall axis is time axis; left direction is moving to the past and right the future direction. The vertical axis is spatial axis; up corresponds to moving counter clock wise, and down counter cloak wise. A replay is a trajectory **a** in this diagram. for example a horizontal line moving right corresponds to the simplest replay of a particuler camera. A vertical trajectory **b** corresponds to freezing the time and flying in the around (i.e., movie Matrix effect). The EyeVision corresponds to the step like trajectory **c**; reply a particular camera, freeze, rotate, and then continue to replay a new camera. The method presented in this document will allow moving not only horizontally or vertically but also diagonally. The effect is to give an impression that the viewer is flying as the event is occurring either forward or backward. For example, the trajectory **d** rotates around the action while rewinding the time. Needless to say, multiple and different kind of space-time trajectory (like **e**) can be realized at the same time.

Variation of the Operation

While the above explanation has been assuming that ALL the physical cameras are static, several variations of operations are possible by combining some physical pan/tilt device-based camera heads:

1) Certain areas of high interest, such as goal areas, are covered with high resolution camera with physical pan/tilt based camera head. By treating their views (videos) as those in the pool of "virtual" camera views available, the whole operation of the system proceeds uniformly, and yet some high resolution video are available for some region of the field.
2) In the system that uses physical pan/tilt based camera heads, each camera captures slightly larger field of view, and whatever servo errors are compensated by computing the virtual video that would correspond to the case with no error, thus realizing smoother transition of view points in fly through.

Technical Details

<<This is exactly the same as the case of using physically moving pan/tilt device-based camera heads, which is repeated below. In the description, the master camera should be read as "virtual master camara", the slave camera by "virtual slave camera, etc. The beauty is that the methods of this patent application is that because it is "controlling" the virtual camera in the computer it can perform the desired motion of pan/tilt and zoom perfectly without control delays or errors that are inherent to any physical control of devices.>>

Calibration

Before operation of the system, each physical camera must be calibrated so that its relationship to the scene, and to the other cameras, is explicitly known. This requires determining the pose (location and orientation) and field of view of the camera with respect to a scene coordinate system. Since there is no moving parts, this procedure is relatively simple and is a well known procedure in photogrammetry and computer vision.

Determining the desired servo-fixation point

During system operation, the virtual cameraman effectively controls the virtual master camera pan, tilt, zoom parameters through the cameraman's user interface.

Based on the pan/tilt angles of the master camera, the master computer determines the equation of a 3D line specifying the principle viewing ray of the master camera. All points on this line can be represented as $\boldsymbol{p} = \boldsymbol{c} + \mathrm{k}\, \boldsymbol{v}$, where $\boldsymbol{p}$ is a 3D point on the line, $\boldsymbol{c}$ is the focal point of the master camera, $\boldsymbol{v}$ is a unit vector representing the orientation of the principal axis, directed out from the focal point, and k is a scalar parameter that selects different points on the line. Only points on the line that are in front of the focal point (i.e. $\mathrm{k} > 0$) are considered to be on the master camera principle viewing ray.

The desired virtual servo-fixation point (SFP) for the spin-image effect is defined to be some point on the principle viewing ray of the master camera. Choosing which point is the SFP is equivalent to choosing a value for parameter k in the above line equation.

The SFP can be determined by specifying k directly through a user interface. Note that k represents the distance or range of the desired SFP from the master camera. It can selected using a one degree of freedom mechanism, by the cameraman or a second operator.

The SFP can be determined by intersecting the principle viewing ray with an equation or set of equations representing a real surface in the scene. For example, the playing field may be approximately represented by the equation of a plane. Alternatively, a more accurate approximation may be to represent the field by a nonplanar, triangulated mesh, or an explicit nonplanar surface equation.

Similarly, the SFP can be determined by intersecting the principle viewing ray with an equation or set of equations representing a virtual (nonphysical) surface in the scene. For example, it may be desired to intersect the viewing ray with a virtual surface located a certain distance, e.g. four feet, above the playing field.

The SFP can be determined by intersecting the principle viewing ray with a set composed of any arbitrary combination real and virtual surfaces in the scene, for example the floor, walls and ceiling of a room.

If the SFP is determined by intersecting the principle viewing ray with a surface or set of surfaces, and there is more than one mathematical intersection point, some method must be used to determine which point is the desired SFP. One method is to always choose the intersection point that is closest to the camera. If there is no mathematical intersection point, some alternate method must be used to determine the SFP. One example is to use the last known valid point of intersection.

Master to slave mapping

The computed target point and size is used to task a set of computer controlled *slave* cameras to achieve simultaneous alignment and focus at the target point in space. Each slave camera is a robotic unit with computer controlled pan, tilt, zoom and focus. A software servo loop running on each slave camera computer is responsible for taking a sequence of computed goal parameters and controlling the slave cameras to smoothly and accurately track the field position designated by the master camera.

For each slave camera, the 3D position of the SFP is used to compute the pan and tilt value that brings the camera principle viewing ray into alignment with the SFP. These values are used to command the pan/tilt unit to move. Ideally, after this movement, the SFP appears in the center of the camera image.

The distance d between camera position $\boldsymbol{c}$ and SFP $\boldsymbol{x}$ is computed. Let vector $(a,b,c) = \boldsymbol{x}-\boldsymbol{c}$. Then d can be computed as $d = sqrt(a*a + b*b + c*c)$.

The zoom of each slave camera can be controlled to keep the object of interest (a person, for example) the same size in all the images, even through the cameras are different distances away from the object. Let r be the desired radius of a virtual sphere subtending the entire vertical field of view of each image. Let d_i be the distance from slave camera i to the SFP. Then the desired vertical field of view angle α_i can be computed as $\alpha_i = 2*\arctan(r / d_i)$. The zoom parameter that achieves this desired field of view is then computed from data collected during the prior zoom camera calibration procedure.

The focus of each slave camera is controlled to achieve sharp focus at the SFP. The focus parameter that achieves sharp focus at distance d_i is computed for camera i using the distance vs focus parameters equations or tables derived from the prior focus camera calibration procedure.

Slave computer camera control

The desired pan, tilt, zoom and focus of each slave camera is communicated to the slave virtual video generator.

Video storage and retrieval

Each camera is synchronized to a common genlock signal, so that the shutter for each camera fires at precisely the same time, resulting in video frames taken at the same time instant.

Video frames from all cameras are time-stamped, and stored digitally, enabling fast retrieval of corresponding frames in time for all cameras. A user interface allows a human reviewer to retrieve video frames temporally (sequential frames in time from a single camera) or spatially (the same time frame, retrieved from a sequence of cameras).

FIGURES

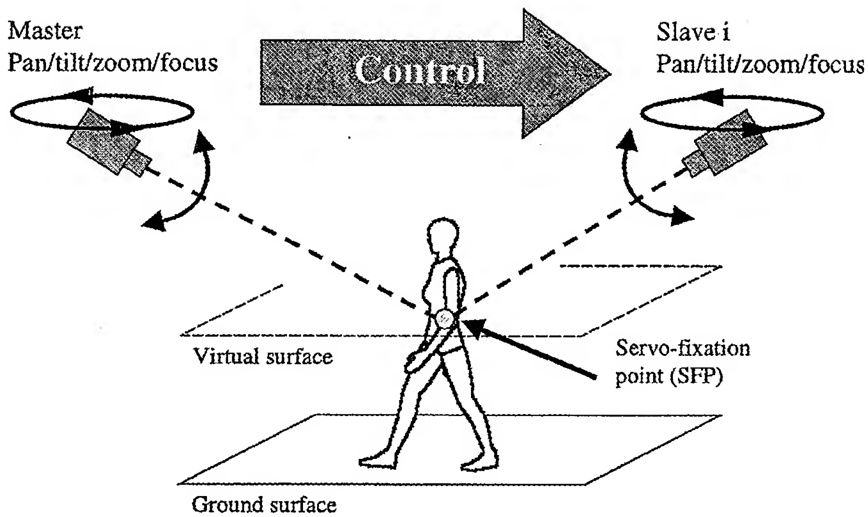

Figure 1: Master camera parameters are mapped onto a virtual surface to determine a 3D servo-fixation point within the dynamic scene. Each slave camera is automatically directed to view this point by computer control of its pan, tilt, zoom and focus parameters.

Figure 3: Overview schematic of multi-camera, master-slave system that can servo on a moving fixation point within a dynamic scene.

EXHIBIT B

Kirkpatrick & Lockhart LLP

Henry W. Oliver Building
535 Smithfield Street
Pittsburgh, PA 15222-2312
412.355.6500
www.kl.com

September 6, 2001

Mark G. Knedeisen
412.355.6342
Fax: 412.355.6501
mknedeisen@kl.com

VIA FACSIMILE

Dr. Takeo Kanade
Carnegie Mellon University
Robotics Institute
Newell-Simon Hall
5000 Forbes Avenue
Pittsburgh, PA 15213-3890

Disclosure Title: SYSTEM ~~AND ME~~THOD FOR OBTAINING VIDEO OF MULTIPLE MOVING FIXATION POINTS WITHIN A DYNAMIC SCENE
Jurisdiction: United States
Our File: 010329

ACTION REQUESTED: Review

Dear Dr. Kanade:

Enclosed is a draft of a patent application directed to the above-identified disclosure. Please review and ensure that all co-inventors review the draft to be sure it correctly and fully describes your invention. The description of the invention must (i) be sufficient to enable a person of ordinary skill in the art to make and use the invention and (ii) disclose the best mode known to you of practicing the invention.

REDACTED

REDACTED

REDACTED

We look forward to receiving your comments and the completed Information Sheet. If you should have any questions or comments regarding this or any other matter, please feel free to contact me.

Sincerely yours,

Mark G. Knedeisen / gg

Mark G. Knedeisen

MGK;gg

Enclosure

cc: Omead Amidi (via fax) (w/enclosure)

EXHIBIT C

Knedeisen, Mark G.

From: Knedeisen, Mark G.
Sent: Friday, September 28, 2001 9:17 AM
To: amidi@Cs.cmu.edu: rcollins@cs.cmu.edu
Cc: 'Takeo Kanade';
Subject: RE: Patent App. 4 (fwd)

Omead and Bob:

I am available for a meeting anytime next week, although Monday morning, any time Tuesday or any time Friday is best. Please let me know what a convenient time and place for you guys are.

Thanks,
Mark Knedeisen
Kirkpatrick & Lockhart, LLP
mknedeisen@kl.com
ph. 412.355.6342
fax 412.355.6501

-----Original Message-----
From: Takeo Kanade [mailto:tk@exchange.cs.cmu.edu]
Sent: Friday, September 28, 2001 3:37 AM
To: 'Knedeisen, Mark G.'
Cc: rcollins@cs.cmu.edu; amidi@Cs.cmu.edu
Subject: Patent App. 4 (fwd)

Mark, Bob and Mark, I will be out of town for 10 days, but before it is too
late, will three of you meet and give our comments on the application draft,
which is in a pretty good shape. Please arrange a meeting among you three
for that ASAP. Thanks.

Takeo

REDACTED

EXHIBIT D

Knedeisen, Mark G.

From:	Robert T Collins [Robert_T_Collins@biscuit.ius.cs.cmu.edu]
Sent:	Friday, October 05, 2001 2:44 PM
To:	Knedeisen, Mark G.
Cc:	'amidi@Cs.cmu.edu'; 'rcollins@cs.cmu.edu'; 'Takeo Kanade' Robert_T_Collins@biscuit.ius.cs.cmu.edu
Subject:	Re: Patent App. 4 (fwd)

Mark,

Here are my comments on the patent document 010329.

REDACTED

--Bob Collins

REDACTED

EXHIBIT E

Knedeisen, Mark G.

From: Knedeisen, Mark G.
Sent: Thursday, October 11, 2001 3:29 PM
To: 'Robert T Collins'; 'amidi@Cs.cmu.edu'; 'Takeo Kanade'
Cc:
Subject: RE: Patent App. 4 (fwd)

red-line spec.doc

REDACTED

To All:

I have amended the patent application

If you have any questions, please feel free to contact me.

Thanks,
Mark Knedeisen
Kirkpatrick & Lockhart, LLP
mknedeisen@kl.com
ph. 412.355.6342
fax 412.355.6501

EXHIBIT F

Knedeisen, Mark G.

From: Robert T Collins [Robert_T_Collins@biscuit.ius.cs.cmu.edu]
Sent: Thursday, October 11, 2001 4:31 PM
To: Knedeisen, Mark G.
Cc: 'Robert T Collins'; 'amidi@Cs.cmu.edu'; 'Takeo Kanade'

Subject: Re: Patent App. 4 (fwd)

Hi Mark. It would be better to

--Bob

REDACTED

EXHIBIT 2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kanade et al.	)	**Examiner:** Anyikire, C.
	)	
Serial No.: 10/032,648	)	**Art Unit:** 2621
	)	
Filing Date: October 23, 2001	)	**Atty. Docket No.** 010329

Title: SYSTEM AND METHOD FOR OBTAINING VIDEO OF MULTIPLE MOVING FIXATION POINTS WITHIN A DYNAMIC SCENE

DECLARATION OF ROBERT COLLINS

I, Robert Collins, declare as follows:

1. I am over the age of eighteen and am competent to make this declaration.

2. I am one of the named inventors for the above-referenced patent application ("the Subject Application").

3. I, along with my co-inventors, conceived of the invention described in the Subject Application prior to September 17, 2001.

4. I have reviewed the declaration of Professor Takeo Kanade executed on September 21, 2010 (the "Kanade Declaration") that is being filed concurrently herewith.

5. I agree with the statements of Professor Kanade set forth in the Kanade Declaration.

6. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any registration resulting

therefrom.

Date: 9/23/2010

Robert Collins

EXHIBIT 3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kanade et al.	)	**Examiner:** Anyikire, C.
		)	
Serial No.:	10/032,648	)	**Art Unit:** 2621
		)	
Filing Date:	October 23, 2001	)	**Atty. Docket No.** 010329

Title: SYSTEM AND METHOD FOR OBTAINING VIDEO OF MULTIPLE MOVING FIXATION POINTS WITHIN A DYNAMIC SCENE

DECLARATION OF OMEAD AMIDI

I, Omead Amidi, declare as follows:

1. I am over the age of eighteen and am competent to make this declaration.

2. I am one of the named inventors for the above-referenced patent application ("the Subject Application").

3. I, along with my co-inventors, conceived of the invention described in the Subject Application prior to September 17, 2001.

4. I have reviewed the declaration of Professor Takeo Kanade executed on September 21, 2010 (the "Kanade Declaration") that is being filed concurrently herewith.

5. I agree with the statements of Professor Kanade set forth in the Kanade Declaration.

6. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any registration resulting

therefrom.

Date: 9/23/2010

Omead Amidi